

**AN ANALYSIS OF THE FORMS OF *CHLOROCLYSTA TRUNCATA*
HUFN. (LEP.: GEOMETRIDAE) AT DARTFORD, KENT**

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AT FIRST SIGHT, considering the multiplicity and complexity of forms of this moth, an analysis of them for a particular area must appear daunting. However, for a specific locality only a few forms may be present, thus simplifying the task. At Dartford the species is a common visitor at my garden m.v. light in two well-marked and similar generations, in some ten readily recognised and relatively stable forms which can be named, and here the species is better described as polymorphic rather than merely variable or liable to produce many aberrations.

Identification of the forms has been based on the unpublished work of Goodson and Read, the series of specimens in the National Collection, and reference to original descriptions. It is unfortunate that there is no work on the Geometers corresponding to Tutt's volumes on the British Noctuae.

Perusal of "Goodson and Read" shows that for *truncata* most of the forms were described in the last century by Continental authors of continental specimens, and there is a plethora of synonyms. Many of these descriptions were vague and ambiguous, and complete reliance on "Goodson and Read" is not advocated. For example, their rendering of the description of ab. *perfuscata* Haw. is "The median area black" which is quite inadequate, but reference to Haworth's original description reveals a detailed and precise definition. On the other hand "Goodson and Read" give a quite good description of ab. *mixta* Prout – "The central area tawny, as in *rufescens*, the basal and marginal areas dark fuscous; hindwings somewhat darkened". At Dartford I see specimens which fit this description exactly, and so had presumed them to be ab. *mixta*. However, the row of specimens in the National Collection display to some degree the white postmedial and submarginal lines present in *rufescens*; in my specimens they are absent. Reference to the original description, hidden in a long paragraph in Prout (1909) is found, on page 44, the following: "Probably the semi-melanic specimens with a tawny central area, deserve a separate name as a sub-aberration (ab. *mixta* mihi, n. ab.". The introduction of the term "semi-melanic" introduces a subjective element, and the ambiguity is compounded by Heydemann (1929) who portrays a figure labelled ab. *mixta* Prout which also possesses white postmedian and subterminal striga. Therefore in my analysis I have considered it prudent to add a description for each form, from "Goodson and Read" or the original.

My analysis is based on the first generation in 1993 (23 May to 4 July, omitting period 1 to 16 June), the second brood in 1994 (4 September to 4 November, omitting period 4 to 28 October) and the first generation in 1995 (22 May to 8 July). The breaks in recording were due to my absence abroad.

The potential value of this exercise is reduced due to delay as melanism is already on the wane in this species although what might be termed normal, non-melanic forms prevalent in East Kent are not yet found here. Because this contribution concerns not only the incidence of the various forms found at Dartford, but also melanism, a further subjective element becomes apparent in deciding which morphs are melanistic.

1. *nigerrimata* Fuchs (syns. *nigerrima* Schaw., *melaina* Müll.) (Plate A, Fig. 1) is the extreme melanic – unicolorous black or very dark grey, sometimes possessing a slightly darker median fascia which is just visible. Kettlewell (1973) classifies it as an industrial and non-industrial melanic found around Chester and Salford. The series in the National Collection is labelled “homozygote”; the figures for Dartford suggest that the form is not dominant.

FORM	1993	1994	1995
<i>nigerrimata</i> (homozygotes)	2.7	1.6	1.4
<i>nigerrimata</i> (homozygotes) (faintly banded)	4.0	3.2	4.3
<i>perfuscata</i>	44.7	47.1	44.5
<i>perfuscata</i> (with pale submarginal area)	5.3	5.8	5.0
<i>nigrobrunneata</i>	11.3	8.3	7.1
Total of above melanics	68.0	66.0	62.3
<i>saturata</i>	6.7	6.6	10.7
<i>rufescens</i>	17.3	21.6	22.0
<i>mixta</i>	6.7	5.8	5.0
miscellaneous	1.3	–	–
Sample	75	121	140

Percentages of forms of *C. truncata* recorded at Dartford in 1993, 1994 and 1995 at garden m.v. light.

Chalmers-Hunt (1971) mentions *nigerrimata* for West Wickham, as does Plant (1993) for the London area in general. The incidence of melanism is listed for a number of localities in Britain in Kettlewell (*op. cit.*), and for Dulwich is the statement, for 1969, “all *truncata* black here”, which might mean 100% homozygotes (*nigerrimata*); but might not the heterozygotes (*perfuscata* Haw.) also be called black? Much of the value of this list is lost due to the absence of either name or description of the insects recorded.

This form is not illustrated in the standard textbooks, and the figure purporting to be *nigerrimata* in Ford (1955) is the heterozygous *perfuscata*. At Dartford this is the one morph noted to have relatively declined in numbers in the past twenty years, from an estimated 10-15% in the 1970s to 5% today.

2. *perfuscata* Haw. There is some confusion as to which specimen the term should apply; my interpretation is that the dark moths shown in Skinner (1983) Pl. 8, Fig. 35 and in Ford (*op. cit.*) Pl. 13, Fig. 14 are typical examples of this form, while that in South (1939) Pl. 66, Fig. 3, labelled *perfuscata* is too pale. However, such specimens are labelled *nigerrimata* heterozygotes in the National Collection (which undoubtedly they are), while a series of brighter and more contrastingly marked insects are labelled *perfuscata*, as illustrated in Skinner (*op. cit.*) Pl. 8, Fig. 33, a specimen from Sussex, which is seen to have a wide, pale whitish submarginal area, and such specimens which occur in small numbers at Dartford I have listed separately. Plant (*op. cit.*) states that *perfuscata* is the commonest form of *truncata* in the London area, and I believe he uses the name in the same sense as I do; Chalmers-Hunt certainly does and has recorded it from West Wickham. The combined figures for these two interpretations of *perfuscata* for Dartford have remained at about 50% in each of the three years; however, a further group has been assessed separately as *nigrobrunneata* Heydemann, but they might well have been included under *perfuscata*.

3. *nigrobrunneata* Heydemann also has a black median band and a blackish terminal area, while the basal and antemedian areas together and the postmedian area are rust-brown. The figure in Skinner, Pl. 8, Fig. 39 appears to fit this description. At Dartford the relative proportion is about 10%, but the subjective element in its determination is high. Heydemann (1929) states that it is obtained from a parentage *nigerrimata* x *nigerrimata*. My comment of this is that I have reared several very small broods from feral female *nigerrimata* (homozygotes), and all the moths reared have resembled the female parent. Therefore I suggest that it is preferable to consider *nigrobrunneata* and *perfuscata* together in the context of melanism, giving a combined figure of about 60%. The corresponding percentage for 1991 and 1992 was 65% (mihi, 1993) so a meteoric decline in melanism is not occurring in this species at present.

4. *saturata* Steph. – “forewings fuscous-ash, with an indistinct unsolid broad central fascia; towards the outer margin is an indistinct ferruginous fascia and some dusky clouds with an undulated white striga. Hindwings fuscescent” (Goodson and Read). Prout (1909) treats *saturata* as nearly synonymous with the type of *truncata*. Its incidence here is about 10%. It is not illustrated in Skinner (*op. cit.*), but in Barrett (1902) Pl. 355, Fig. 1c and South (*op. cit.*) Pl. 66, Fig. 4 are specimens similar to these greyish examples at Dartford, and which seem to answer the description above. It is a form seen commonly in rural Surrey at Abinger; I assume its numbers will increase relatively here as melanism declines.

5. *rufescens* Strøm. The illustration in Skinner Pl. 8, Fig. 34 is an accurate representation of Dartford specimens, but that in Ford Pl. 13, Fig. 12 purporting to be *rufescens* is surely *ochreata* Schille – “the median area light ochreous, and in a varying degree mixed with whitish” (Goodson and Read),

another aberration in the *rufescens* complex, and one I have not seen here. About 20% of Dartford *truncata* are *rufescens*, and it is equally common in both generations.

6. *mixta* Prout is a melanistic form, blackish or sooty-grey with a dull brown median patch as in *rufescens*, but it lacks all white markings. I believe it to have a parentage *nigerrimata* x *rufescens*; it represents about 5% of *truncata* here. There is some confusion concerning this form for Heydemann (1929) provides an illustration purporting to be *mixta*, which it is not as it retains the white strigae of *rufescens*, while a series labelled *mixta* in the National Collection is similarly mis-named, being *fusco-rufescens* Prout, however, in Goodson and Read (*ibid*) appears the significant statement under *fusco-rufescens* – “similar to the preceding *mixta* Prout but differs in the retention of some white markings in the proximal and distal areas and in the non-melanic hindwing”.

Form *mixta* is readily recognisable and must surely be present in industrial areas where *nigerrimata* and *rufescens* occur together, yet it is absent from the National Collection, and perhaps consequently is not mentioned by Kettlewell (*ibid*); it is not portrayed in the standard British textbooks, although it is in the Continental works by Hoffmeyer (1949). Chalmers-Hunt gives it no mention, and although the author and Skinner live and have collected in the London area, neither possess specimens or are acquainted with the form, hence it not being portrayed in the wide selection of forms shown in the latter's well-known work.

7. *russata* Hbn. is one of several forms in which the median band includes some white. Chalmers-Hunt (*op. cit.*) states that in East Kent the type is the commonest form, but that *russata* and *rufescens* also occur. Thus the *truncata* population there is very different from that at Dartford forty miles distant. The appearance, or reappearance, of *russata* here will mark a significant step in the decline of melanism; however, this species appears to be undergoing a much slower transformation consequent upon decline in melanism than such species as *Biston betularia* L., *Hydriomena impluviata* D. & S. and *H. furcata* Thunb.

8. miscellaneous. Remarkably, over more than two decades, specimens of *truncata* have varied only slightly and within the few forms recorded. In 1993 a paler than usual specimen was noted, resembling that illustrated in Barrett Pl. 355, Fig. 1, or that in Skinner Pl. 8, Fig. 36 in markings, but grey instead of having the faintly brownish tinge frequent among specimens from the Burren of Co. Clare, which in the National Collection are left un-named. This Dartford specimen would seem to be *griseofasciata* Müll. which possesses an unbroken grey band within the middle area stretching from the costa to the inner margin.

This analysis may well have been justified if it has merely described the *truncata* population here at this time, but its value will have been enhanced

if further such investigations are conducted by comparison. By giving descriptions as well as names I hope this will have been made easier; in several ways *truncata* is an ideal species for such study.

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SELIDOSEMA BRUNNEARIA VILL. (LEP.: GEOMETRIDAE): DIMORPHISM IN WESTERN IRELAND AND DESCRIPTION OF A NEW FORM

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IN AUGUST 1974 specimens were collected from a flourishing colony of this insect on the Carboniferous Limestone coast south of Fanore in Co. Clare. Later it became evident that two distinct forms of the male (no females were seen) were present, one with the normal grey ground colour with dark markings including border, the other dull brown with the dark markings less contrasting. Specimens intermediate in character were also seen.

Despite the habitat of grey rocks, this dull brown form seems to be another example of what Kettlewell (1973) terms Western Coastline Melanism, and corresponds with such species as *Eupithecia venosata* Fab. and more especially with *Camptogramma bilineata* L. which on the coast of western Ireland produces both normal and melanistic specimens.

Description of new form

ab. atlantica ab. nov. (Plate A, Fig. 13)

All wings dull, medium to darkish brown, with no trace of grey; discal spot present; terminal fascia darker brown, appearing less contrasting with